

## **PENDING CLAIMS**

1. (twice amended) An array composition comprising:
  - a) a substrate with a surface comprising discrete sites;
  - b) a population of microspheres comprising at least a first and a second subpopulation, wherein each subpopulation comprises a bioactive agent, wherein said microspheres are distributed on said surface, and wherein at least one of said subpopulations does not have an optical signature; and
  - c) at least one fiducial.
2. An array composition according to claim 1 wherein at least one of said subpopulations comprises a unique optical signature.
3. (amended) An array composition according to claim 1 wherein each subpopulation comprises an identifier binding ligand that will bind a decoder binding ligand for identification and elucidation of said bioactive agent.
4. An array composition according to claim 1 wherein said substrate is a fiber optic bundle and said fiducial is a fiducial fiber.
5. (amended) An array composition according to claim 1 wherein said substrate is a fiber optic bundle, said array comprises at least three non-linear fiducials, and each of said fiducials is a fiducial fiber.
6. An array composition according to claim 5 wherein at least one of said fiducial fibers has a different shape from the others.

7. An array composition according to claim 1 wherein said fiducial is a defined edge of said substrate.
8. An array composition according to claim 1 wherein said fiducial is a fiducial bead.
9. An array composition according to claim 1 wherein said bioactive agents are nucleic acids.
10. An array composition according to claim 1 wherein said bioactive agents are proteins.
11. An array composition according to claim 1 further comprising a computer readable memory comprising:
  - a) computer code that receives a first data image; and
  - b) computer code that registers said first data image using said fiducial to generate a first registered data image.
12. An array composition according to claim 11 wherein said computer readable memory further comprises:
  - a) computer code that receives a second data image;
  - b) computer code that registers said second data image using said fiducial to generate a second registered data image; and
  - c) computer code that compares said first and said second data image.
- 18.(amended) A method of making an array composition comprising:
  - a) forming a surface comprising individual sites on a substrate;
  - b) distributing microspheres on said surface such that said individual sites contain microspheres, wherein said microspheres comprise at least a first and a second subpopulations each comprising a bioactive agent; and wherein at least one of said subpopulations does not have an optical signature; and
  - c) incorporating at least one fiducial onto said surface.

19. A method according to claim 18 wherein said subpopulations further comprise an identifier binding ligand that will bind a decoder binding ligand for identification and elucidation of the bioactive agent.
20. A method according to claim 18 wherein at least one of said subpopulations further comprise an optical signature for identification and elucidation of the bioactive agent.
21. A method according to claim 18 wherein said substrate is a fiber optic bundle and said fiducial is a fiducial fiber.
22. A method according to claim 18 wherein said substrate is a fiber optic bundle, said array comprises at least three non-linear fiducials, and each of said fiducials is a fiducial fiber.
23. A method according to claim 22 wherein at least one of said fiducial fibers has a different shape from the others.
24. A method according to claim 18 wherein said fiducial is a defined edge of said substrate.
25. A method according to claim 18 wherein said fiducial is a fiducial bead.
26. A method according to claim 18 wherein said bioactive agents are nucleic acids.
27. A method according to claim 18 wherein said bioactive agents are proteins.
44. A composition according to claim 1, wherein said discrete sites are wells.
45. A composition according to claim 1, wherein said microspheres are randomly distributed on said substrate.

46. A method according to claim 18, wherein said discrete sites are wells.

47. A method according to claim 18, wherein said microspheres are randomly distributed on said substrate.

48.(new) A method according to claim 1 or 18, wherein said identifier binding ligand is a protein.

49.(new) A method according to claim 1 or 18, wherein identifier binding ligand is a nucleic acid.